Lake Huron Eurasian Ruffe Reduction
Protocol in the Thunder Bay River

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The U.S. Fish and Wildlife Service, Fishery Resources Office (FRO) in Alpena, Michigan is conducting efforts to reduce the numbers of spawning phase adult Eurasian ruffe (*Gymnocephalus cernuus*) in infested waters of the Thunder Bay River in Lake Huron. These efforts are intended to reduce the number of progeny and the overall population. Thunder Bay River is the only known location where ruffe have been found in Lake Huron. Reduction of the ruffe abundance may prevent their unassisted spread to other nearby areas of the lake.

Background
The Eurasian ruffe (ruffe), an invasive percid, was introduced from the ballast of ocean-going freighters and established populations in western Lake Superior in the mid-1980s. In 1992, two ruffe were found in the Thunder Bay River during routine invasive species surveillance. The Alpena FRO began to monitor this population and impacts on the existing fish community in 1993. In 1999, a large year class of ruffe was the most abundant component of the fall trawl catch that year. In 2002, efforts were initiated to depress the population by removing spawning phase adults and thereby reducing their reproduction potential. Early spring gillnetting with small mesh net was employed as the most successful method for capturing ruffe. These efforts continue annually to reduce the ruffe population.

Objectives
Objectives of the ruffe reduction program in the Thunder Bay River are to:
1. Remove adult ruffe prior to spawning, and
2. Identify the structure of the adult spawning ruffe population.

Sampling Procedures
Ruffe reduction efforts are conducted from early April through the end of May near dropoff areas within the Thunder Bay River. Five locations within River have been targeted for ruffe removal. When ruffe are captured from an area, increased effort is applied to that area to remove as many ruffe as possible.

Sampling Gear
A 30.5 m x 1.8 m small mesh gillnet (3.8 cm stretch mesh monofilament twine) is the primary gear used to remove adult spawning phase ruffe. A minimum of 4 nets are set per night (week nights) at 4 locations during the reduction effort. Over night sets are used and effort is measured as a lift and catch is measured as catch per lift. Specifications on the gear and protocol follows:

Protocol
The following step-by-step protocol is followed:
1. Bridles, anchor lines, anchors, buoy lines, and buoys are attached to each gillnet.
2. The net is deployed at the sampling location (perpendicular to shore).
3. Data sheet is completed.

4. Fish are removed from the net, placed in a basin of water, and sorted by species.
5. The net is either reset if during the week or removed for the weekend.

Target (invasive) species: The target species is ruffe. Total length (mm), weight (g), and sex are recorded for each ruffe captured. Aging structures (otoliths, dorsal spines, or scales) are removed from all ruffe captured. Ruffe are then labeled and frozen for future studies or needs.

Non-target species: The total catch per species is recorded for all non-target species and returned to the water alive when possible.

A minimum of 4 lifts per week night (week nights) is desired per location. When 4 locations are fished each week, the total effort is approximately 16 lifts per week.

Data Measurements
The following abiotic and biotic data measurements are recorded for all surveillance efforts.

Abiotic data
- Project code, Station code, and Location
- Lake Statistical district and Lake grid
- Crew initials and Vessel name
- Gear code and Effort
- Date, Time set and Time lift
- Set and Lift Coordinates in Latitude and Longitude (recorded with GPS)
- Set and Lift Water depth (m)
- Substrate description
- Surface and Bottom Water temperature (°C)
- Light and Wind/Wave speed and direction

Biotic data
- Species code
- Total length (mm)
- Weight (g)
- Scale/Spine/Otolith identification number (see *Target Species*)